

We claim:

# CLAIMS

- 1 1. A method of estimating a channel in a communication system, the method  
2 comprising:  
3 receiving a block of “n” transmitted symbols, the symbols including pilot  
4 symbols and “d” data symbols;  
5 estimating a channel using the pilot symbols to create a channel estimate;  
6 choosing a group of “m” strongest symbols from the “d” received data  
7 symbols;  
8 compensating the group of “m” strongest symbols using the channel estimate to  
9 create a group of “m” compensated symbols;  
10 re-estimating the channel using the group of “m” compensated symbols and pilot  
11 symbols; and either:  
12 repeating the steps of choosing the group of “m” strongest symbols,  
13 compensating the group of “m” strongest symbols and re-estimating the channel,  
14 or  
15 using a latest channel estimate to compensate all symbols within the  
16 block.
- 1 2. The method of claim 1, wherein the communication system is an OFDM  
2 communication system.
- 1 3. The method of claim 1, wherein “m” is less than “d”.
- 1 4. The method of claim 1, wherein “m” equals “d”.
- 1 5. The method of claim 1, wherein the communication system is associated with a  
2 multi-antenna receiver.

- 1 6. A method of estimating a channel in a communication system, the method  
2 comprising:  
3 receiving a block of "n" transmitted symbols, the symbols including pilot  
4 symbols and "d" data symbols;  
5 estimating a channel using the pilot symbols to create a channel estimate;  
6 choosing a group of "m" strongest symbols from the "d" received data  
7 symbols;  
8 compensating the group of "m" strongest symbols using the channel estimate to  
9 create a group of "m" compensated symbols;  
10 re-estimating the channel using the group of "m" compensated symbols and pilot  
11 symbols; and either:  
12 choosing a group of "x" strongest symbols, compensating the group of  
13 "x" strongest symbols and re-estimating the channel, or  
14 using a latest channel estimate to compensate all symbols within the  
15 block.
- 1 7. The method of claim 6, wherein "m" is less than "d".
- 1 8. The method of claim 7, wherein "x" is less than "m".
- 1 9. The method of claim 6, wherein "x" is greater than "m".
- 1 10. The method of claim 6, wherein "d" equals "m" and "m" equals "x".
- 1 11. The method of claim 6, wherein the communication system is associated with an  
2 OFDM protocol.
- 1 12. The method of claim 6, wherein the communication system is associated with a  
2 multiple antenna receiver.
- 1 13. A method of estimating a channel in a wireless receiver, the method comprising:  
2 receiving a block of "n" transmitted symbols, the block including pilot symbols  
3 and "d" data symbols;

4           estimating a wireless channel using the pilot symbols to create a channel estimate;  
5           choosing a group of “m” strongest data symbols from the “d” received data  
6   symbols;  
7           compensating the group of “m” strongest symbols using the channel estimate to  
8   create a group of “m” compensated symbols;  
9           re-estimating the wireless channel using the group of “m” compensated symbols  
10   and pilot symbols; and  
11          either:  
12                  repeating the steps of choosing the group of “x” strongest symbols,  
13                  compensating the group of “x” strongest symbols and re-estimating the channel  
14                  at least once, or  
15                  using a latest channel estimate to compensate all data symbols within the  
16          block.

1   14.   The method of claim 13, wherein “m” equals “x”.

1   15.   The method of claim 13, wherein “x” is less than “m”.

1   16.   The method of claim 13, wherein “m” equals “d”.

1   17.   The method of claim 13, wherein if the steps of choosing a group of “x”  
2   strongest symbols, compensating the group of “x” strongest symbols and re-estimating  
3   the channel at least once are repeated, the steps are repeated a plurality of times.

1   18.   A method of estimating a channel in a communication system, the method  
2   comprising:

3           receiving a block of symbols;

4           estimating a channel using at least one of the symbols;

5           choosing a group of symbols from the received symbols;

6           compensating the group of symbols using the channel estimate; and

7 re-estimating the channel using the group of compensated symbols and the at  
8 least one of the symbols.

1 19. The method of claim 18, further comprising either:  
2 repeating the steps of choosing a group of symbols, compensating the group of  
3 symbols and re-estimating the channel, or  
4 using a latest channel estimate to compensate all symbols within the block.

1 20. The method of claim 18, wherein the at least one of the symbols is a pilot  
2 symbol.

1 21. The method of claim 18, wherein the group of symbols chosen is chosen based  
2 on signal strength.

1 22. The method of claim 21, wherein the signal strength of the symbols chosen in  
2 the group is associated with a predetermined criteria.

1 23. A method of estimating a channel in a wireless receiver, the method comprising:  
2 receiving a block of "n" transmitted symbols, the block including pilot symbols  
3 and "d" data symbols;  
4 estimating a wireless channel using the pilot symbols to create a channel estimate;  
5 choosing a group of "m" strongest data symbols from the "d" received data  
6 symbols;

7 compensating the group of "m" strongest symbols using the channel estimate to  
8 create a group of "m" compensated symbols;

9 re-estimating the wireless channel using the group of "m" compensated symbols  
10 and pilot symbols;

11 determining whether a number of iterations is equal to or greater than T; and  
12 if the number is less than T:

13 choosing "x" strongest symbols;

14 compensating the "x" strongest symbols; and

15                   repeating the method continuing at the step of re-estimating the channel  
16           using the “x” compensated symbols and the pilot symbols; and  
17           if the number is equal to or greater than T:  
18                   using a latest channel estimate to compensate all data symbols within the  
19           block.

1   24.    A method of estimating a channel in a wireless receiver according to claim 23,  
2   further comprising:  
3           if “x” is equal to or greater than “m”:  
4                   setting “m” equal to “x”; and  
5                   repeating the method from the step of choosing a group of “m” strongest  
6           symbols from the “d” received data symbols; and  
7           if “x” is less than “m”, continuing the method at the step of choosing “x”  
8   strongest symbols.

1   25.    A system for performing channel estimation associated with a wireless  
2   communication system, the wireless communication system receiving a block of symbols  
3   including pilot symbols and data symbols, the channel estimation system comprising:  
4           a symbol selector;  
5           an initial channel estimator;  
6           a symbol compensator; and  
7           a channel estimator, wherein the initial channel estimator produces an initial  
8   channel estimate using the pilot symbols and the symbol selector chooses a group of “m”  
9   strongest data symbols, and wherein the “m” strongest data symbols are compensated  
10   using the initial channel estimate and the channel estimator re-estimates the channel  
11   using the compensated symbols and the pilot symbols.

1   26.    A method of recovering data symbols from a plurality of data sequences using a  
2   symbol selector and a symbol compensator, the method comprising:

3 receiving the plurality of data sequences at the symbol selector;  
4 choosing a strongest data sequence from the plurality of data sequences;  
5 choosing "m" strongest data symbols from the strongest data sequence;  
6 choosing "m" data symbols at the same frequency tone positions in at least one  
7 unchosen data sequence of the plurality of data sequences; and  
8 recovering original symbols from the plurality of data sequences using the "m"  
9 strongest data symbols from the strongest sequence and the "m" data symbols from the  
10 at least one unchosen data sequence.

1 27. The method of claim 26, wherein the strongest data sequence is chosen  
2 according to a signal strength of each of the plurality of sequences.

1 28. A method of choosing data symbols to transmit to a symbol compensator, the  
2 method comprising:  
3 receiving a plurality of data sequences at a symbol selector;  
4 choosing a strongest data sequence from the plurality of data sequences;  
5 choosing "m" strongest data symbols from the strongest data sequence;  
6 choosing "m" data symbols at the same frequency tone positions in at least one  
7 unchosen data sequence of the plurality of data sequences; and  
8 transmitting the "m" strongest data symbols from the strongest data sequence  
9 and the "m" data symbols from the at least one unchosen data sequence to the symbol  
10 compensator.